

WELFARE AND FOOD ASSISTANCE AT THE STATE AND SUB-STATE LEVEL: A FRAMEWORK FOR EVALUATING ECONOMIC AND PROGRAMMATIC CHANGES

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Welfare and food stamp program changes may affect local economies, and economic changes may affect local program participation. In this paper we outline a model of these interactions. First we highlight key changes in the programs and report recent program and labor market participation patterns in metro and non-metro portions of the Midwest and the state of Iowa. Then we describe computable general equilibrium (CGE) model equations that formalize the types of choices being made and discuss the regional economic impacts that can be simulated. In the process, we raise several related research questions.

The goal of welfare reform is to decrease household dependency on transfer payments from government. States have been encouraged to tailor programs to their own circumstances two ways: by waivers (prior to 1996) and by the conversion of the previously "need-based" intergovernmental transfers to blocked grants (since 1996). Waivers gave states the authority to administer their own programs, and blocking means they must do so with a limited budget. The requisite for federal funding under the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996 is that states require able-bodied welfare recipients to make the transition from welfare to work or risk losing benefits. It is also the first act since the original Social Security Act of 1935 to impose a time limit on dependency. Ideally, the reform

encourages increased labor market participation by low income households. Other ways that households can become independent (without changing family composition) are via increased child support payments being sought and received by single parents, or by incurring debt.

Since the passing of the PRWORA, the USDA has been investigating the impact of devolution on the Food Stamp Program (FSP). A key question for the USDA is whether the fiscal burden on the food stamp program will increase as state assistance programs become more stringent (Kuhn, LeBlanc, and Gundersen). If there is a national or state recession, or as needy families hit the state-mandated time limits, food stamp use may increase as participation in welfare programs decline.

Historically, enrollments in both welfare (AFDC) and FSP changed together over time. Recent trends are similar. However, it is not yet clear why FSP rolls have continued to decline with those on Temporary Assistance to Needy Families (TANF) (Wallace and Blank). The parallel reductions in caseloads are due in part to the nationwide economic expansion since 1993. The Council of Economic Advisors (CEA) estimated that 31–44% of the reduction in program participation has been due to the booming economy, while 14–30% of the reductions appear to be due to state-specific changes in the programs.

There may also be rural/urban as well as state-specific factors. According to the Rural Policy Research Institute (RUPRI): "While caseloads have gone down in rural areas, labor force participation among the rural poor has not increased. Between 1992 and 1997, labor force participation among the poor increased by 8% in urban areas and 4%

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Table 1. Midwest Program and Labor Force Participation, by Location, 1996

Participation	Metro 72.1%		Non-metro 27.9%		Totals
	Work	Not work	Work	Not work	
$T = 0, F = 0$	28.6%	11.7%	12.7%	5.1%	57.6%
$T = 0, F = 1$	5.3%	4.9%	3.9%	2.0%	16.0%
$T = 1, F = 0$	0.5%	0.4%	0.1%	0.2%	1.3%
$T = 1, F = 1$	6.7%	14.5%	1.5%	2.4%	25.1%
% in region	56.4%	43.6%	65.2%	34.8%	100.0%

Data: SIPP 1996 Wave 1 (weighted); householders age eighteen to sixty-five years with non-transfer income less than or equal to 130% poverty.

Note: $T = 1$ if participate in income support program, 0 otherwise; $F = 1$ if participate in Food Stamp program, 0 otherwise.

in suburban areas, *but did not change in rural areas*" (emphasis in original).

Since attaining economic self-sufficiency in rural areas is likely to be more difficult because welfare recipients in rural areas must search a larger geographic area for job opportunities, it may be that persons who would difficulty finding work in any market will not choose to reside in rural areas. Thus, rural labor force participation rates may be higher because only those most likely to be employed select the area.

Data on the Midwest are consistent with the hypothesis that the potentially dependent Midwestern poor self-select metropolitan residential locations (and avoid non-metro ones). Table 1 summarizes Midwest program and labor force participation rates using 1996 Survey of Income and Program Participation (SIPP) data. A larger proportion of the Midwest's non-metro poor aged eighteen to sixty-five years were working in 1996, compared to metro (65.2% versus 56.4%). Chi-squared tests of the dependence of labor force and/or program participation on metro/non-metro residence location show that (a) poor Midwest non-metro households participate in labor markets more, while (b) poor Midwest metro households participate more in TANF and FSP than expected, all significant at $\alpha = 0.001$.

Focusing on a particular state's economic and program changes may help identify the state-specific effects on caseloads. Throughout the 1990s, Midwestern states have enjoyed the benefits of a healthy economy. In Iowa since 1995, the statewide unemployment rate has remained well below the nationwide 5% rate. This statewide economic success, however, has an uneven geographic distribution. County level unemployment rates in Iowa in 1996 ranged from 2.1% (Warren) to 8.0% (Adams), with the

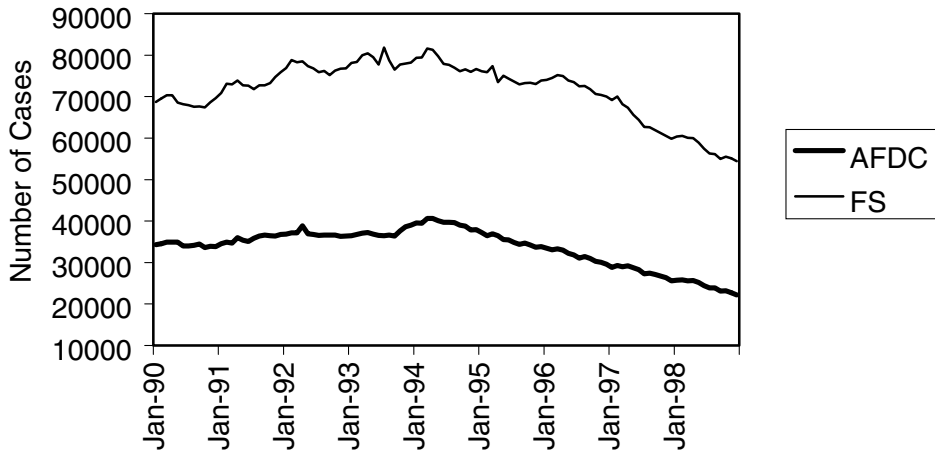
five counties having the highest unemployment rates being predominately rural counties (Institute for Economic Research).

In 1993 the State of Iowa implemented reforms under a waiver to create the Family Investment Program (FIP). The FIP's goals of helping program recipients leave poverty and become economically self-supporting parallel the intent of the PRWOR Act (Iowa Department of Human Services 1996). The FIP merged and coordinated several existing programs, and tied support for job training, education, child care, and transportation more directly to income transfers. Iowa has had to change its FIP very little to meet the current federal guidelines.

Caseloads in Iowa for the AFDC/FIP and FSP both peaked around the time of the implementation of the FIP waiver (1993–94) (figure 1). After that, FIP participation has declined more than FSP enrollments. The proportion of metro versus non-metro counties cases has been about the same for AFDC/FIP and FSP during this decade (about half the cases in each program are in Iowa's ten metro counties).

What factors have contributed to the reductions in Iowa's caseloads? Analyses of recidivism among FIP exiters in Iowa during the 1993–96 period indicate that living in a metro area in Iowa increases the probability of staying off of FIP (Keng, Garasky, and Jensen). This suggests that it is easier to get (and stay) off welfare if one lives in a metro area in Iowa. Among economic and income variables, both wage income and child support had a positive and statistically significant effect on staying off of public assistance. Nearly 90% of those leaving FIP and returning within six months received FSP benefits during the transition period. For these cases, FSP was an alternative safety net.

The findings about Iowa are consistent with what has been reported in nationwide stud-



Source: Iowa Dept. of Human Services

Figure 1. AFDC (TANF) and food stamp caseloads in Iowa 1990–98

ies. Most studies of former welfare recipients have found that between half and three-quarters of parents are employed after they leave the rolls (Parrott). However, wages are typically below \$8 per hour, and often below \$6 per hour. As a result, earnings levels of exiters are still well below poverty. Recent national research also shows that the probability of successfully leaving public assistance varies with personal characteristics (education, job experience, age, ethnicity) and family composition (marital status, number of dependents) (cf., Moffit, Sandefur and Cook).

The implication of these facts and figures for a state/substate CGE model for program evaluation is that the model should (a) distinguish households by personal characteristics and family composition, (b) be able to simulate either higher or lower rural (compared to urban) labor market and program participation, (c) simultaneously model (endogenize) earned income and program participation, (d) distinguish rural from urban labor markets, and (e) track transfers of child support as well as changes in household indebtedness.

Structural Equations for a State/Sub-State CGE Model

A CGE model is a system of simultaneous equations representing the choice problems of all agent types in an economic system: as producers, consumers, labor suppliers, welfare program participants, governments, etc.

Most of this interregional CGE model of Iowa is described elsewhere (Kilkenny 1993, Kilkenny and Otto, Kilkenny 1999a). In this paper we present new structural equations for modeling welfare and food stamp programs. The key behavioral hypothesis is that households will choose (a) whether or not to work, (b) to work locally or to commute, and (c) to participate in programs depending on which set offers the highest current disposable income (see also Keane and Moffitt).

Households are distinguished by family composition (married or single head, numbers of dependents), age (under or over sixty-five), and other program-relevant characteristics. All non-institutionalized under sixty-five householders are modeled as potential suppliers of differentiated types of labor: service, operator/farm/unskilled, clerk, craft, technical, professional, or executive. There is significant variation across sectors in demand for the different types of labor. The occupational composition of each sector's workforce is formalized in the CGE model by a fixed-coefficient table that dis/aggregates occupational types, by sector, in the same way that industrial goods are aggregated into composite capital goods for each sector. Regional demand for labor is the product of the sectoral demand for labor times each sector's occupation mix.

Each type of labor supplied by each household also chooses between working locally or commuting. This discrete choice problem is modeled using a modified Kuhn–Tucker condition for allow for corner solutions, in probability terms, benchmarked to base year obser-

uations. Gross labor income (YW) if one works is from either the local labor market or the market within commute range: $YW = (Y_L \cdot L + Y_C \cdot C)$ (household subscripts dropped for simplicity). Work locally ($L = 1$) would be chosen if earnings are higher in the local labor market than as a commuter, net of commuting costs (CC): $L \cdot (Y_L - Y_C - CC) \geq 0$. Otherwise, commute ($C = 1$) to work. This is guaranteed by constraints that (a) L and C are non-negative, (b) all non-zero L are equated to unity by $L = L/L$, and (c) $L + C = 1$. The choice of which labor market to participate in depends on opportunities, wages, and remoteness. The farther away one is from an alternative labor market, the higher the commute costs, and the less likely one would be to commute.

Earned income is compared to eligible transfer income to determine whether and how much a household participates in welfare programs. Transfer income (YT) adds to total net disposable household income, given the participation choices ($i = F, T$ contained in $[0, 1]$), at the stipulated benefit levels per household ($HHT_{hh,i}$): $YT_{hh} = F_{hh} \cdot HHT_{hh,F} + T_{hh} \cdot HHT_{hh,T}$. Thus, benefits are simultaneously determined with the earned income level for each type of household. A logistic function is calibrated to reproduce the participation choice variables F_{hh} and T_{hh} at observed base-year probabilities.

The benefit levels per household type are the product of eligibility criteria times the stipulated annual amounts per household by type (Committee on Ways and Means). For example, $HHT_{hh,F} = E1_F \cdot E2_F \cdot 12 \cdot GMAX_{hh} - 0.3 \cdot Y1_{hh,F}$, where $E1_F$ and $E2_F$ are the 0/1 eligibility criteria with respect to net ($E1_F$) and gross ($E2_F$) income; $GMAX$ is the maximum FSP transfer, and $Y1_F$ is the household's reference income for FSP. $Y1_F$ is earned (YW) plus unearned income (N) which includes child support payments received; plus the benefits from other programs ($HHT_{hh,T} + HHT_{hh,other}$), net of the standard deduction (\$134/month) and household-specific deductions ($DCTN_{hh}$): $Y1_{hh,F} = .8 \cdot YW_{hh} + N_{hh} + HHT_{hh,T} + HHT_{hh,other} - 12 \cdot 134 - 12 \cdot DCTN_{hh}$. Note that the amount of support received under the TANF program ($HHT_{hh,T}$) enters the determination of eligibility and the level of FSP, formalizing one of the avenues for cross-program linkages. If welfare support ($HHT_{hh,T}$) declines, eligibility and demand for FSP support ($HHT_{hh,F}$) may increase.

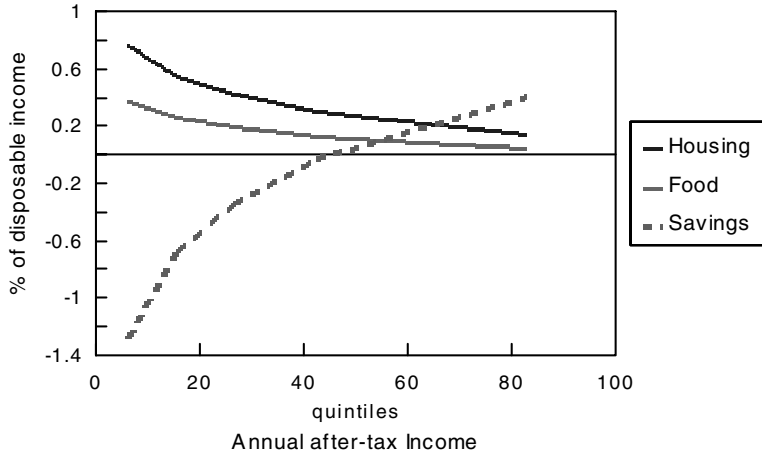
A household is eligible for food stamps [$E1_{hh,F}$ (and $E2_{hh,F}$) = 1] if their reference income level $Y1_{hh,F}$ (and $Y2_{hh,F}$) does not exceed the eligibility limit(s) $M1_{hh,F}$ (and $M2_{hh,F}$). For example, $E1_{hh,F}(M1_{hh,F} - Y1_{hh,F}) \geq 0$ returns the non-negative declared variable $E1_{hh,F}$ positive if the reference (counted) income is smaller than the limit, and zero otherwise. Non-zero eligibility variables are normalized to unity by dividing them by themselves. The many other household-specific equations (not included here to conserve space) determine the second FSP eligibility criterion, the benefit levels for TANF, and the multiple TANF eligibility criteria.

Households choose to work ($W_{hh} = 1$) only if work income (YW) net of commuting costs ($CC \cdot C$) exceeds transfers (YT) plus unearned income (N): $W \cdot (YW + CC \cdot C - YT - N) \geq 0$; otherwise, $W = 0$ (hh subscripts dropped for simplicity). In sum, the model should simulate the simultaneous decision by each household type to participate in transfer programs (T, F) and to work locally, commute, or not at all (L or C , and W). Earnings are endogenously determined with respect to occupation-specific labor demand by sectors across regions.

The CGE framework strength is that it highlights the circular flow of income from production (and/or transfers) to consumption, and back again. Another innovation in our state/substate CGE model for program evaluation concerns household expenditure: preferences are explicitly non-homothetic, and parameterization is not household-type specific. Engel's Law is the widely documented phenomenon that as income rises, the share of consumer expenditure on necessities falls, and the share spent on luxuries rises. For this model, we choose an approximation of the "almost ideal demand system" recommended by Deaton and Muellbauer (1980), called the Working-Leser demand model. Expenditure shares are defined explicitly as a function of income:

$$P_c Q_{c, hh} / \sum_c P_c Q_{c, hh} \\ = S_{c, hh} = \alpha_c + \beta_c \log YD_{hh}$$

where subscript c indexes category of expenditure, subscript hh refers to household type, $S_{c, hh}$ is the share of household type hh 's expenditure on c , P_c and Q_c denote the price and demanded quantity of c , respectively,



Source: 1996 Consumer Expenditure Survey, Bureau of Labor Statistics

Figure 2. Expenditure shares

and YD_{hh} denotes the household's disposable income (gross of transfers and net of taxes and inter-household transfers). Figure 2 shows the Engel functions given preliminary estimates of α_c and β_c using consumer expenditure survey data. Consumer expenditure survey data are well known to be problematic with respect to the measurement of household income and thus saving/dissaving. The main pattern, however, is clear: when saving and contributions to social insurance are expenditure items, they are luxuries and other items are necessities.

Thus, this model will simulate a decrease (increase) in net saving as household incomes fall (rise). The formulation is an important point of departure for dynamic modeling of welfare reform. Also, while some low-income households in dissaving mode are retirees, consuming out of their accumulated stock of wealth, others are accumulating debt. Both types of dissaving, however, reduce the amount of loanable funds available for physical capital investment. Both affect the sectoral composition of aggregate demand, and thus regional employment.

Typical modeling of final demand in CGE models relies on budget shares that are specific to each household type, which do not change regardless of changes in the level of income of households in the type. This *ex-ante* rigidity is undesirable in a model in which the movement into/out of poverty is a key endogenous feature. It can lead to simulating larger and larger household *indebtedness* as households' incomes rise. In contrast, this model's demand parameters (α and β) are

not household-type specific. A single demand function can be used to generate unique household budget allocations for any endogenously determined income level. This makes it possible to disaggregate households according to criteria that, while very relevant to program participation and eligibility, are *exogenous* to the state of the economy.

Changes in the Economy or Programs

The CGE framework described above may be used to evaluate a recession in the non-farm economy, coupled with a change in the state's budget. During a non-farm recession, the employment of some occupations will decline relatively more than others, given intra- and interstate labor mobility and the concomitant sticky wages. More metro as well as non-metro households will become eligible for transfers. State tax revenues at the initial tax rates will decline.

Under the PRWORA, the state's receipt of intergovernmental transfers for TANF is fixed. Thus, during a recession the state must either raise taxes, reduce temporary assistance, or reallocate spending. The first strategy is progressive, the second is regressive, and the third is unpredictable. A progressive strategy will shift the composition of aggregate demand toward necessities; a regressive strategy will shift aggregate demand toward luxuries.

Shifts in the necessity/luxury composition of aggregate demand will have different sub-state effects. All types of places, rural,

urban, and metro, offer necessities, but not all types of places offer luxuries. Central Place Theory posits that goods and services produced at high economies of scale, purchased infrequently, or for which the threshold price is high, are generally only available in metropolitan locations (see DiPasquale and Wheaton). These are called "Central Places" in part because they serve customers from their surrounding non-metro areas. Metro areas will suffer more than proportionately from decreases in household incomes in the state, as spending decreases relatively on normal and luxury goods, compared to spending on necessities. These outcomes have been demonstrated using the Fiscal SAM developed for this CGE model (Kilkenny 1999b).

Summary and Questions for Further Research

This paper motivated and introduced a specific elaboration of a substate CGE model for the evaluation of safety net programs. The empirical evidence indicates that economic opportunity, metro/non-metro location, and household composition are critical determinants of welfare (in)dependence. This CGE thus distinguishes households by composition, has an explicit spatial, sectoral, and occupational composition of labor demand, and jointly determines program and labor market (commute/not) participation choices. Furthermore, consumer demand reflects Engel's Law. Given the different sectoral mix between metro and non-metro substate regions, this model can simulate differential substate impacts due to changes in the economy and/or programs.

In the process of specifying the general equilibrium model we confronted a number of yet unanswered questions. Some must be answered before we can finish calibrating the CGE model described above. The answers to the other questions will likely inspire yet another level of analysis. To calibrate the existing model, we must delineate the labor markets areas within the state (using the BEA's Economic Areas, for example) and then measure potential commuting costs. We must document and calibrate regional purchase coefficients. We must also account for interregional flows of child support payments within and outside the state. We need to find

better data on household income, expenditure, and (dis)saving, then estimate demand function parameters. And we must estimate the probabilities of the three discrete choice problems for households.

To proceed to the next level of analysis, we should also address the following questions. How do the time limits on welfare benefits affect the decisions to participate in TANF and/or work? Do households "bank" TANF eligibility? Which adjustment(s) will state governments make during recessions: raise taxes, lower transfers, reallocate resources across programs, or spend down surpluses? Is there a link between the PRWORA reforms and the recent increases in household debt? Welfare reform may well have induced significant changes in the intertemporal allocation choices of both households and state governments. We will need to understand these changes to fully evaluate the new programs.

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